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REVIEWS

The Sea Floor: An Introduction to Marine Geology

E. Seibold and W. H. Berger, Springer Verlag, 1993, 356 pp., approximately $46.

The authors of the second edition of *The Sea Floor: An Introduction to Marine Geology* are to be commended for providing an easily readable book on marine sedimentology, its history, and its profound foundations for interdisciplinary research. The explosive growth of marine geological research and knowledge during the last 2 decades could easily overwhelm anyone wishing to summarize it. The authors acknowledge this in their preface: "We attempted neither a balanced nor an encyclopedic survey," and this is clearly evident in this 356-page tome with numerous figures and appendices. The book concentrates on sedimentary marine geology, with only enough geophysics and igneous petrology necessary to place scientific hypotheses in context.

A concise history of marine geological research is the basis of the introduction, followed by two chapters on the morphology of the ocean basins, geophysical insights, and continental margin structures. Chapter three provides a good review of the sources of marine sediments, which is followed by a reasonable chapter on the effects of waves and currents on sedimentation patterns on continental margins.

The second half of the book, dealing with how sedimentary marine geology helps reconstruct the Earth's past history, starts with a chapter on various processes affecting sea level change without so much as mentioning uplift from earthquakes. Biologic productivity is the basis for chapter six, followed by climatic zonation of biology and physical oceanography. Chapter eight has a fairly standard description of deep sea sedimentation patterns, including some awkward descriptions of CCDs and lysoclines. Chapter nine deals with paleoceanography, including a good description of the effects of oceanic gateways and ice ages. The final chapter deals with seafloor resources, including petroleum products, placer deposits, gravels and sands, and heavy metals from hydrothermal vents. A brief epilogue summarizes where marine geology is and possible future directions.

One of the themes that emerges from the book is the incredibly interdisciplinary nature of marine sedimentology. Knowledge of physical oceanography, geography, meteorology, biology, astronomy, geophysics, and chemistry are all needed to understand and reconstruct Earth's history. The other theme the authors successfully bring out are the rapid advances in sedimentology since the mid 1960s with the introduction of plate tectonics, deep sea drilling, and isotopic dating. Marine sedimentology has undergone a revolution over the last quarter century that is poorly acknowledged elsewhere.

Despite these grand themes, chronic and disturbing characteristics of the book rapidly emerge. Since the material seems to be written for a nonspecialist, references are given as author and date only, an inexcusable style given the dominance of journal articles in marine geology. The inquisitive reader has no clue as to the location of such seminal works, except to dig through mostly outdated—but nevertheless important—books at the end of each chapter or in the reasonable summary of symposia proceedings and books at the end of the book.

The writing style is often breezy, contains incomplete information, often assuming prior knowledge, erroneous statements, and poorly constructed sentences. Gratuitous statements such as "Sooner or later, every marine geologist becomes familiar with some of the less pleasant effects of waves, when at sea" do not belong in a serious book. A short reference to the "Dupal Anomaly in the Indian Ocean" leaves readers bewildered as to the kind of anomaly or its importance if they have not encountered it before. Very misleading (and erroneous) statements include "[The continents]...are the product of selective accumulation of low-density mantle material. Because of this low density they float on the mantle." Incomplete sentences are often found, including "First, the salinity distributions [sic]."

Third, the authors attribute the ocean with a consciousness and an ability to make decisions: "To balance this input [of calcium from rivers and hydrothermal circulation], the ocean precipitates calcium carbonate." Finally, the plenitude of typographical errors, misspellings, poor figure captioning, poor figure reproductions with three point type, an inverted figure, chapters designated zero and "E" leaves the reader wondering whether Springer-Verlag provided any editorial help or whether a good graduate student gave the galley proofs a good review.

While the figures are plentiful, only a handful were created for the book. The textual references to the figures clearly indicate that a particular point is illustrated in the figure, but too often the figure was used originally to make a slightly different set of points. The figure captions do not clarify matters much, suggesting the authors were somewhat sloppy or lazy. A good example is during the discussion of 50- to 100-km along-axis segmentation of the ridge crest. Figure 1.9, supposed to demonstrate this point, is a cross-section of oceanic crust across the ridge axis, not along axis. Thankfully, full references to the source of figures are provided in all of the figure captions.

After reading the book, I continually wondered who the targeted audience might be. The book is clearly not designed to be a reference source for the practicing marine geologist. Neither can it be used as an introductory text for serious marine geologists. To use it as such would require much clarification by the instructor and previous classes in geology and oceanography. I can only surmise that the book's usefulness is for a nongeology specialist. If so, the numerous errors and typographic lapses will not impress anyone favorably. As a second, and revised, edition, I would expect more than two prominent geologists and a reputable publisher to ensure a quality product.—*Randall Jacobson, Office of Naval Research, Arlington, Va.*